

Hardy Fern Foundation NEWSLETTER

Editor Sue Olsen • VOLUME 6 NUMBER 2 • SPRING 1996



President's Message

Sylvia Duryee

Spring - Once again we are watching the wonderful uncurling of crosciers - unbelievable! Along with *Trillium rivale*, and *Anemonella* blooming we see *Jeffersonia diphylla*, *Jeffersonia dubia* and the *Calthas*. The *Osmunda's* are up as is *Polystichum polyblepharum*. I am always glad that the ferns have their own time table and like *Doodia media* and *Dryopteris championii* some can be so very late that I almost give up waiting.

To bring you up to date, the board has approved a request from Les Jardins de Metis in Quebec, Canada to be a display garden. They join Inniswood Metro gardens in Columbus, Ohio as our newest member gardens. We are still working on the Bellevue Botanical Garden plans. It may be a short while before this Display Garden is on line. You'll find in this issue the first reports from our main garden and original satellite gardens on hardiness and ornamental value. We look forward to presenting these reports annually from now on. In our next issue we plan to publish excerpts from reports by individual members so do get out and evaluate your plants (*ed. This means you!*) and send your comments to Sue Olsen at 2003 128th Ave. S.E., Bellevue, WA 98005. Thank you.

This year the HFF joined forces with The Rhododendron Species Botanical Garden and together created a single display for the Northwest Flower and Garden Show in Feb. at the Seattle Convention Center. Richie Steffen (RSBG Nursery manager) and John Putnam of the HFF created an award winning display. A gold medal plaque and Award of Merit for an Exceptional Educational Exhibit now hang in the RSBG Lawrence Pierce Library where we hold our board meetings. Thanks to all who helped set up, man the display as well as take it down and thanks especially to Janet Dalby for lining up the volunteers. This year's volunteers enjoyed meeting many of the RSBG volunteers as well as the many visitors.

I would like to remind you of the dates for our Fern Festival - May 31 - June 1 with our Annual Meeting and speaker, Steve Hootman, scheduled for the evening of the 31st. Hope to see you there.

Fern Festival 1996

The Annual Fern Festival will be held at The Center for Urban Horticulture, 3501 NE 41st St., Seattle, WA on May 31 and June 1, 1996. The festival will begin with a plant sale and display featuring ferns and companion plants from 1:00 to 5:00 P.M. on Friday, May 31. At 6:30 P.M. we will have our annual meeting followed by our speaker Steve Hootman who will give a slide show on the plant discoveries and adventures from his recent trip to China. This should be an outstanding presentation. The plant sale will continue on Sat. from 10:00 to 2:00.

Nomenclature Alert

Dorothy Hood
Pine Hill Farm Nursery
Sykesville, MD

This is a plea that ALL of us be accurate in identifying the ferns we sell - OR if unknown SELL them without a name.

It is a very displeasing situation when large amounts of money have been invested in plants, either for resale or in one's own garden, to tell a visitor-customer this is a *Dryopteris xoa*, only to find that it should be *Dryopteris aaa* or even *Polystichum*! There is so much controversy over the proper name even among experts. Let's do all we can to buy and sell as and from responsible people. (*Ed. Amen*) It is our future success at stake. It seems we are fast approaching a new era in gardening in which the fern is at last coming into its own. What graces a garden more beautifully than a well grown fern?

Another problem has come to the fore recently. Many ferns, and other plants are coming from areas in Europe with heavy infestations of root node nematodes and are being marketed by the less scrupulous as healthy!

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American Institute of Biological Sciences Meetings August 1996, Seattle, WA

Field Trips

Three field trips and a reception are scheduled for the AIBS meetings next summer. Sign up for one or all! The Snow Lake and Cle Elum River trips will leave Seattle (University of Washington) at 8:30 a.m. and return by 5:30. Space is limited to 30 participants for each of these two trips. The Garden Tours will leave UW at 9:00 a.m. and return around 5:00. Space is limited to 40.

Snow Lake Trail Field Trip - Friday August 2, 1996

This trip will start with a one hour drive to Snow Lake Trail with a brief stop enroute at Denny Creek Road to see *Polystichum andersonii*. The day will be spent hiking Snow Lake Trail to the Source Lake area. Spectacular scenery, old growth forests and ferns such as, *Thelypteris quelpaertensis*, *Phegopteris connectilis*, and *Cryptogramma cascadiensis*, are in store for members joining this tour. Trip leaders are Laura Potash and Ed Alverson.

Cle Elum River & Asahel Curtis Nature Trail Field Trip - Saturday August 3, 1996

This tour will include multiple stops starting near Little Indian Springs to see the hybrid of *Polystichum munitum* X *P. scopulinum*. A second stop at Little Indian Springs will allow participants to view serpentine indicators such as *Aspidotis densa*, *Polystichum scopulinum* and the serpentine endemic *Polystichum lemmonii*. Following lunch at Lake Cle Elum the group will proceed to Asahel Curtis Nature Trail west of Snoqualmie Pass. A 1.3 mile loop trip through old growth forest will include a variety of ferns such as *Gymnocarpium dryopteris*, *Adiantum aleuticum*, *Dryopteris austriaca* (*expansa* ed.) *Blechnum spicant*, *Polystichum munitum*, *Polypodium glycyrrhiza*, *Lycopodium clavatum* and *Lycopodium* (*Huperzia* ed.) *selago*. David Wagner will be the trip leader.

Gardens Tour - Sunday August 4, 1996

Participants will travel to the Rhododendron Species Botanical Garden at Weyerhaeuser Corporate Headquarters in Federal Way, WA. This beautiful 25 acre garden houses the Hardy Fern Foundation's (HFF) main display and test garden of close to 100 different ferns and cultivars in a landscaped setting among rhododendrons, mature conifers and other collections. Visitors will see extensive plantings of *Dryopteris*, *Polystichum*, *Athyrium* and other hardy material. Bonsai enthusiasts will also find one of the country's foremost displays on the campus. Box lunches will be served at the home of Barbara Carman where, weather permitting, guests can enjoy a spectacular view of Mt. Rainier. The afternoon tour will feature a trip to Lakewold Gardens on Gravelly Lake in Tacoma. This ten acre garden has a comprehensive collection of many types of plants from rock garden specimens to deciduous and evergreen trees from around the world. There is a special HFF display garden in addition to the many ferns that are a part of the landscape. The final stop of the day will be at the home and nursery (Foliage Gardens) of Sue and Harry Olsen. This small garden contains Sue's collection of 200 plus native and exotic ferns as well as Harry's collection of Japanese maple cultivars. Light refreshments will be served.

Hardy Fern Foundation Reception - Monday August 5

The Hardy Fern Foundation will host a reception for members of the American Fern Society and HFF members on Monday evening, August 5 at 7:30 p.m. at the University Faculty Club. HFF board member and Rhododendron Species Botanical Garden Curator, Steve Hootman will show slides and discuss his recent trip to the interior mountainous regions of China. Several new to science species were discovered on this expedition. The Faculty Club is near the UW residence halls. Reservations are requested and can be made on the AIBS registration form or with Ruth Hofmann, 8949 Woodbank Dr., N.E., Bainbridge Island, WA 98110 for those not registering for the conference. We look forward to seeing you there!

How Cold it was - 1996 Winter January 25, 1996

Nina Lambert - Ithaca, NY

I don't know what your winter is like but ours has been truly foul. Early snow. Big snow. Three weeks ago we had water inside the house walls due to ice dams on the roof. The next week, flooding on the outside due to thaw. Then freeze, turning streets to skating rinks. We had to use the hair dryer to defrost the locks on the cars.

Three weeks ago, icicles appeared, not just dripping down from the eaves but sticking out of the shingles on the east side of the house. Looked like the grown out stubble on someone who hadn't shaved. Eerie. Little white sprouts over the facade. The following day, it warmed and there were streams of water running down inside the same section of the house but on the west. Great, already.

Jack did things on the roof..but it ran on until the temperature dropped below 20. I hung out the second floor window whacking at icicles with a hockey stick and all I could hear were answering tap-taps from all over the neighborhood-from Jack chiseling on the roof above, from someone next door hammering away on a ladder, an antiphonal of more taps coming from two other houses further up hill, one or two downhill, etc. In vaudeville, it was just one guy with glasses of water. In Ithaca, on a winter day, the entire neighborhood works up an anvil chorus.

A week later, there was thaw. Big time. Two foot high ice banks disappeared over night. The next morning, torrential rain followed by a drop from 50 to 10 degrees (F) in less than two hours. Although all was frozen on the surface, the sump pump kept working. God bless. There were weeks when I had to remind myself that God's last name was not "dammit".

A New Light on Spores *Arachniodes Standishii*

Sue Olsen, Bellevue, WA

Arachniodes standishii is a beautiful and hardy fern that rarely makes its way into the catalogues not because every grower would not rejoice to have an amply supply, but because those same growers are still waiting for the spores to develop, or drop or germinate. I have been given spores from a number of very reliable sources but have a mere three plants (stock for now) in the garden as a result of those propagation efforts. Meanwhile one of those plants finally produced a fertile frond which matured in September 1995. The indusia, however remained stubbornly and firmly attached. December arrived and that fertile frond was still taunting me with no sign of an impending spore drop. Finally I removed a pinna enclosed it origami style in white paper and placed it 5" under a 60 watt bulb. In three hours I had my spores - tons! The temperature, meanwhile reached 100 degrees F. Not knowing whether this would have an adverse effect on the spores I repeated the process 7" below the lamp. This time the temperature was 85 and the spores took longer to drop, but drop they did. Both sets were planted immediately and six weeks later both cultures were crowded with prothallia. I have given them their first transplant and now we wait the final test - sporelings. I am hoping for the best and have subsequently successfully tried light treatment on several other species that are also reluctant to open specifically *Blechnums*. If any of our readers have experimented with various ways to promote spore growth we would certainly like to hear from you.

Whoops!!

While broadcasting in Portland, Oregon, Cass Turnbull, Editor of PLANT AMNESTY (906 N.W. 87th Street, Seattle, WA 98117) reports that a call-in listener said that "a young couple of his acquaintance received a 200-year-old bonsai from a distant rich uncle as a wedding present. Not realizing the plant's history, the groom remarked that it looked a bit 'potbound'. The bride reportedly wrote in the thank-you note, 'The tree is doing better since we planted it in the back yard.' "

New Book by Dr. Irving Knobloch

"HYBRIDS AND HYBRID DERIVATIVES IN THE PTERIDOPHYTES"

EAST LANSING, Mich. The Michigan State University museum is pleased to offer for sale the results of Dr. Knobloch's 29 year search of the literature for putative hybrids in the Pteridophytes, bringing together his previously published three reports plus all new hybrids in the Flora of North American, Vol. 2, (Oxford University Press). This reference work should be of great value to those working on any aspect of pteridophyte evolution.

Hybridization has long been recognized as a widespread phenomenon in many plant groups including pteridophytes. Many polyploid organisms are thought to have had a history of previous crossing but only a few of these have been investigated. In animals the phenomenon is not as common but there are numerous insect, fish and even a few bird hybrids. Not all plant hybrids are sterile and in some species sterility has been outmaneuvered by vegetative means or by apogamy.

Not only are interspecific hybrids common in plants but there are quite a number of intergeneric ones, especially in the ferns. Many of the hybrids have maintained themselves for decades and thus they are real and must be added to any floral or faunal treatment.

There are about 1100 names related to pteridophyte hybridity and these are backed up by almost 700 references. Dr. Knobloch has paid for the computerizing of the manuscript and all net proceeds will accrue to the Michigan State University Museum. The publication is 102 pages and is spiral bound. Send your orders to MSU Museum Store, Michigan State University, East Lansing, MI 48824-1045, along with a check for \$10.00, plus U.S. postage of \$2.00 or \$3.50 foreign.



Polystichum aculeatum



*Hardy
Fern
Foundation*

The Hardy Fern Foundation

Newsletter is published quarterly by the Hardy Fern Foundation, P.O. Box 166, Medina, WA 98039-0166.

Articles, photos, fern and gardening questions, letters to the editor, and other contributions are welcomed!

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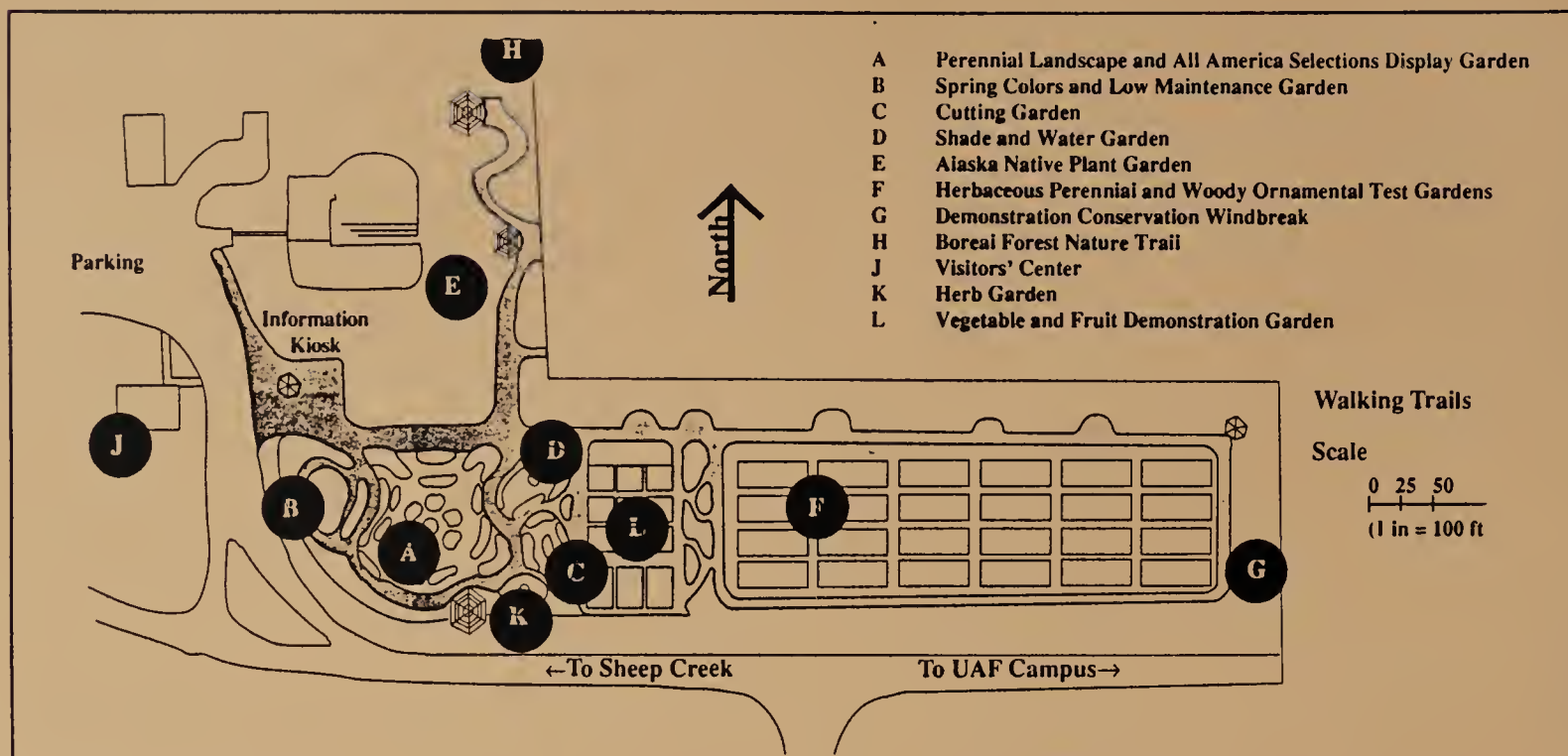
Graphics: Karie Hess

Satellite Garden Profile - The Georgeson Botanical Garden, Fairbanks, Alaska

to the east; and the gold fields 20 miles to the northwest. The land was chosen because of its size and proximity to this transportation corridor as well as the

and pioneered the use of polyethylene mulches for vegetable production. In the early 1970s, he expanded their cultivar trials to include more annual flowers. The

colorful demonstration flower garden attracted considerable local interest, and as the tourism industry expanded during the pipeline construction boom, the garden became a focal point for Fairbanks visitors.



The Georgeson Botanical Garden officially began in 1987. In that year the name was changed from the Horticultural Demonstration Garden, and we started the slow transition from an annual flower and vegetable garden to the landscaped botanical garden. Despite the fairly recent changes, the Georgeson Botanical Garden continues a tradition that was begun during the gold rush era.

In 1905, the citizens of the Fairbanks area petitioned the Secretary of Agriculture to establish an experiment station somewhere in the Tanana Valley. At that time, 82 homesteads were registered in the valley. In August of that year, Charles Georgeson, director of Alaska Agricultural Experiment Stations, explored the Tanana Valley for possible station sites. With a considerable amount of persuasion from members of the Fairbanks Chamber of Commerce, Georgeson selected 1393.97 acres that were located nearly midway between Chena and Fairbanks. The land adjoined the junction of the old narrow gauge Tanana Mines Railroad that ran between Chena, 4.98 miles to the south; Fairbanks, 4.27 miles

availability of good soils for farming and its close proximity to the homesteaders.

Early work at the experiment station emphasized cultivation of grains, grasses and potatoes, but there were always plots of vegetables, flowers, fruits and landscape ornamentals available for public viewing. From the beginning the purpose of the station was to learn which crops would grow best, to develop techniques for crop production, and to share that knowledge with local residents. That tradition has continued without interruption since 1906.

In the 1970s the horticulturist in charge of the demonstration gardens was Dr. Donald Dinkel. He experimented with everything from artichokes to zucchini

Through the 1980s the garden expanded, and today more than 30,000 visitors enjoy the gardens each summer. The transition from demonstration garden to botanical garden occurred, in part, to accommodate the increased public use. However, the most important reason was to improve the way we continue our 87-year-old tradition of experimenting with horticultural crops, developing new cultivation techniques and sharing that information with all Alaskans.



*Georgeson Botanical Garden.
Provided by Georgeson Botanical Garden.*

The Namesake

Dr. Charles Christian Georgeson established Alaska's system of agricultural experiment stations. The Secretary of the Department of Agriculture instructed him, at age 47, to go to Alaska and "Act as if the country is your own and go ahead."

Georgeson did.

In 1898, he started his mission with his first station in Sitka, then Alaska's capital. In rapid succession, he opened experiment stations in Kenai, Rampart, Copper Center, Kodiak and Fairbanks. All were up and running by 1917. Today just Fairbanks and Matanuska (renamed Palmer) continue researching Alaska's agricultural potential.

When not opening research stations, Georgeson developed fruit and vegetable varieties for the Great Land including strawberries, wheat, peas, and a beardless barley. All grew rapidly and matured early to meet the needs of Alaska's short, but productive growing season.

He continued to promote Alaska after his retirement.

Georgeson loved his adopted lands--both of them, the United States and its stepchild, the Territory of Alaska. A native of Denmark, he moved to the United States in 1873 to study at Michigan State University. There he earned one of the schools' first doctorates.

We're proud to name these gardens in honor of this Alaskan agricultural pioneer.

Polystichum Aculeatum

Hardy Shield Fern

Jim Horrocks

The species name "aculeatum" comes from "aculeata" - that is, having prickles with sharp points, a rather descriptive term for this fine evergreen fern. Originally this species was named P. lobatum but this was later changed. Native to the British Isles and Europe, it is a fairly widespread species in England and Scotland but rare in Ireland. Often found in mountainous areas, woodlands and hedgerows, it is particularly fond of limestone and frequents the mountain limestones of northern England. Kaye says that it is found more often in "wetter" areas and is often locally abundant.

P. aculeatum is sometimes confused with P. setiferum but there are some important differences. In P. aculeatum, the pinnules, which tend to run together, are sessile rather than stalked and are, at the base, acute rather than obtuse. The veins in P. aculeatum run past the sori to the margins while in P. setiferum, the veins terminate at the sori. For a long time, P. aculeatum was regarded as only a form of P. setiferum but modern cytological study has revealed that P. aculeatum is

tetraploid ($2n = 164$), whereas P. setiferum is diploid ($2n = 82$).

Description: The thick woody rhizome is clothed with pale brown ovate-lanceolate scales and surrounded by old frond bases. The stipe is from one-fifth to one-half the length of the frond, with dense brown scales particularly on the lower portion. The fronds are lanceolate in outline, leathery in texture, pinnate to bipinnate, and from one to three feet or even longer in really favorable locales. The fronds can be dark green to yellowish green and rather glossy above but not so much as in P. neo-lobatum or P. polyblepharum. The pinnules are usually sessile, that is, attached without a stalk, and are unequal at the base. The lowest acroscopic pinnae are quite enlarged, giving this fern the familiar "Polystichum thumbs" or auricles. The sori are small and numerous and are usually found on the upper half of the frond. The veins on which the sori occur continue to the margin of the pinnae. The indusia are circular and peltate.

Culture: This is generally a rather easy fern to grow in the shaded garden, requiring a soil on the alkaline side but rich in leafmold and peatmoss. It is well suited among large rocks and makes a good companion with other lime-loving ferns. In most gardens it will grow one to two feet in length, the outer fronds more or less spreading, the inner ones somewhat more erect. It is rather easy from spore and can be quite effective in a large grouping with Fortune's Holly fern (Cyrtomium fortunei) and the Hart's Tongue Fern (Asplenium (Phyllitis) scolopendrium).

References:

Hardy Ferns, Reginald Kaye, 1968, Faber and Faber LTD, London

Ferns, Roger Grounds, 19764, Pelham Books, LTD, London

A Guide to Hardy Ferns, Richard Rush, 1984, British Pteridological Society, London



Polystichum Aculeatum. Photo by Kim N. Durrant, SLC, Utah.

GARDEN REPORTS

We are pleased to present the first of our evaluations from our main garden as well as our early member satellites. Newer satellites will join the reporting efforts in future years.

The Rhododendron Species Foundation and Botanical Garden

Evaluation for Hardy Fern Foundation

Fern Name	Accession Number	Number Alive	Overall Size in.	Spore past yr.	Commercial Value	Garden Worthiness rate 1 to 5
Adiantum aleuticum subpumilum	90/319	1	16	yes	yes	5
Adiantum pedatum	90/322	1	30	yes	yes	5
Adiantum venustum	90/149	many	12	yes	yes	5
Adiantum viride-montanum	90/323	2	30	yes	yes	5
Arachnoides simplicior var major	90/147	1	26	yes	yes	5
Asplenium trichomanes Incisum	91/038	4	12	yes	yes	5
Athyrium filix-femina var Bornholmiense	90/151	1	10	yes	yes	5
Athyrium filix-femina var Angustum	90/154	1	30	yes	yes	3
Athyrium filix-femina var minutissimum	90/290	3	18	yes	yes	5
Athyrium mesosorum	90/314	1	12	no	no	2
Athyrium niponicum	90/291	2	22	yes	yes	4
Athyrium niponicum var Pictum	90/132	9	24	yes	yes	5
Athyrium otophorum	90/129	8	28	yes	yes	5
Athyrium thelypteroides	90/153	dead				
Athyrium vidalii	90/133	dead				
Blechnum penna-marina	093/93	many	5	yes	yes	5
Blechnum spicant	90/282	3	36	yes	yes	5
Blechnum spicant var Serratum Rickard	90/283	3	20	yes	yes	5
Cheilanthes lanosa	91/039	1	12	yes	yes	3
Cryptogramma crispa		many	9	yes	yes	5
Cyrtomium caryotideum	91/040	8	18	yes	yes	5
Cyrtomium falcatum x caryotideum	90/146	1	18	yes	yes	5
Cyrtomium fortunei var Intermedium	90/286	3	16	yes	yes	5
Cyrtomium lonchitoides	187/94	3	12	yes		
Cyrtomium macrophyllum	90/285	5	28	yes	yes	5
Dryopteris aemula	90/296	1	20	yes		
Dryopteris championii	90/303	1	8	no		
Dryopteris clintoniana x goldiana	90/375	1	36	yes	yes	4
Dryopteris cycadina	90/376	8	26	yes	yes	4
Dryopteris cystolepidota	168/94	3	22	yes	yes	5
Dryopteris darjeelingensis	186/94	5	12	no		
Dryopteris dilatata	90/294	4	22	yes	yes	5
Dryopteris dilatata Lepidota 'crispa'	90/373	6	22	yes	yes	
Dryopteris dilatata var Recurvata	90/139	8	36	yes	yes	5
Dryopteris erythrosora	90/126	2	28	yes	yes	5
Dryopteris erythrosora Prolifica	91/042	5	6	yes	yes	4
Dryopteris erythrosora var. Prolifica	90/297	3	22	yes	yes	5
Dryopteris f-m var linearis Polydactyla	90/135	8	38	yes	yes	5
Dryopteris pseudo filix-mas	90/161	1	46	yes	yes	4
Dryopteris scottii	184/94	5		no		

The Rhododendron Species Foundation and Botanical Garden

Evaluation for Hardy Fern Foundation

Fern Name	Accession Number	Number Alive	Overall Size in.	Spore past yr.	Commercial Value	Garden Worthiness rate 1 to 5
Dryopteris sieboldii	90/292	2	24	yes	yes	4
Dryopteris varia var. Setosa	90/127	12	26	yes	yes	5
Dryopteris wallichiana	90/138	13	36	yes	yes	5
Gymnocarpium dryopteris	90/130	many	10	yes	yes	5
Gymnocarpium dryopteris var Plumosum	90/131	many	10	yes	yes	5
Matteuccia struthiopteris	90/292	6	26	no	no	5
Osmunda cinnamomea		many	48	yes	yes	5
Osmunda claytonia	90/302	many	24	no	yes	5
Osmunda regalis		many	36	yes	yes	5
Phyllitis scolopendrium	90/289	3	12	yes	yes	5
Polypodium scolopendrii	90/287	5	9	yes	yes	5
Polystichum acrostichoides	90/145	6	12	yes	yes	
Polystichum aculeatum	90/305	1	10	yes	yes	
Polystichum braunii	90/164	5	30	yes	yes	5
Polystichum californicum	90/326	1	16	yes	yes	3
Polystichum makinoi	91/045	8	16	yes	yes	4
Polystichum neolobatum	91/046	7	22	yes	yes	4
Polystichum polyblepharum	90/165	7	24	yes	yes	5
Polystichum retroso-paleaceum	90/313	3	34	yes	yes	5
Polystichum setiferum Rotundatum cristatum	90/284	5	10	yes	yes	
Polystichum setiferum var congestum	90/143	7	2	no		
Polystichum setiferum var Divisilobum	90/141	1	2	no		
Polystichum setiferum var thompsonii	90/140	1	10	yes		
Polystichum sp. China	90/162	2	16	yes	yes	3
Polystichum squarrosum	90/312	2	20	yes	yes	5
Polystichum tsus-simense	90/163	8	16	yes	yes	5
Polystichum x illyricum	90/304	1	8	yes	yes	
Thelypteris decursive-pinnata	90/128	many	24	yes	yes	5
Thelypteris phegopteris	90/155	2	16	yes	yes	4
Woodsia obtusa	90/310	1	14	yes	yes	3
Woodwardia areolata	90/167	many	18	yes	yes	4



Ferns shipped in 1994

DALLAS ARBORETUM

Evaluation for Hardy Fern Foundation

Fern Name	Accession Number	Number Alive	Number Dead	Overall Size in.	Length of new growthl	Spore past yr.	Commercial Value	Garden Worthiness rate 1 to 5
Athyrium otophorum		4	0	14	15 - 20	yes	no	3
Dryopteris arguta		4	0	27	17.5	yes	yes	4
Dryopteris bissetiana		4	0	37	29	yes	yes	5
Dryopteris dilatata Jimmy Dyce		3	1	8	8	yes	no	2
Dryopteris dilatata Lepidota cristata		2	4	6		no	no	1
Dryopteris f-m undulata Robusta		4	0	37	28	yes	yes	4
Osmunda regalis Purpurascens		1	0	24	13	yes	maybe	4
Phegopteris decursive-pinnata		4	0	35	24	yes	yes	5
Phyllitis scolopendrium		1	3	13	12	yes	no	1
Polystichum setiferum Divisilobum		5	0	17	13	yes	yes	4

Dallas. What kind of growing year have we had?

Eugene Westlake - Horticulturist

We wish to thank you and the Hardy Fern Foundation for the donation and for choosing The Dallas Arboretum for participation in the HFF Satellite Gardens program. This letter, along with the evaluation form, will give you a good idea about the past growing season at The Dallas Arboretum.

Our spring was a little cooler than normal and rainfall was slightly above normal. The summer temperatures were near normal. However, our rainfall for the months of July, August, and September was well below normal, and the dry weather has continued into October.

If you should have any additional questions, please let us know. We look forward to receiving more ferns and to the continued study and evaluation of them. Thank you again for your consideration.

Ferns shipped in 1994

DENVER BOTANIC GARDEN

Evaluation for Hardy Fern Foundation

Fern Name	Accession Number	Number Alive in.	Number Dead	Overall Size in.	Length of new growthl	Spore past yr.	Commercial Value	Garden Worthiness rate 1 to 5
Dryopteris bissetiana	9411870	3	3	15	12	yes	slow	2
Dryopteris dilatata Jimmy Dyce	941184	2	0	3	1	no	slow	2
Dryopteris dilatata Lepidota cristata	941188	2	0	4	3	yes	slow	2
Osmunda regalis Purpurascens	941183	0	1					
Osmunda regalis Undulata		0	3					
Phegopteris decursive-pinnata	941185	3	3	24	18	yes	yes	5
Phyllitis scolopendrium		3	3	15	9	yes	yes	5
Polystichum setiferum Divisilobum	951275	1	0	10	4	no		4

Denver. What kind of growing year have we had?

Mary Ellen Tonsing

We had a very mild, warm winter with only one night when the temperature dropped to -10°.

That was followed by a very wet, cool spring. We had more precipitation in two months than we normally get annually which is under 15". We did not get over 50° at night until after June 15.

We then had a normal hot, dry summer with few afternoon rain showers.

The ferns loved the cool, wet spring and grew rapidly.

Most of the ferns shipped to DBG are planted in the Rock Alpine Garden. Payanoti Kelaidis, curator of the rock garden, has created some wonderful woodland beds. In one bed, the ferns share space with a large planting of double bloodroot with the blue meconopsis. Under his care, the ferns you shipped last year are doing well.

The only ones stressed or that have died were planted in other areas in DBG that I thought were inappropriate for the ferns such as the Osmundas.

GEORGESON - FAIRBANKS, ALASKA

Scientific Name	accession #	Date Planted	Number Planted	Number dead	Height (Inches)	Spores?	Winter Survival Rating
	10364					no	
<i>Adiantum aleuticum</i>		6/24/95	4			no	0
<i>Asplenium (Phyllitis) scolopendrium</i>		07/01/94	5	2	3	no	3.4
<i>Athyrium filix-femina</i>		07/14/93	10	1	17	yes	1.2
<i>Cystopteris bulbifera</i>		07/14/93	10	8	9	no	3.3
<i>Dennstaedtia punctilobula</i>		07/14/93	2	2		no	4
<i>Dryopteris arguta</i>	11785	07/01/94	5		13	no	2
<i>Dryopteris bissetiana</i>	11786	07/01/94	5	5		no	4
<i>Dryopteris campyloptera (austriaca)</i>		07/14/93	10		19	no	.3
<i>Dryopteris dilatata 'Jimmy Dyce'</i>	11787	07/01/94	5	1	7	no	1.8
<i>Dryopteris dilatata 'Lepidota cristata'</i>	11788	07/01/94	5	1	5	no	2.2
<i>Dryopteris filix-mas</i>		07/14/93	10	1	13	yes	.6
<i>Dryopteris filix-mas 'Undulata robusta'</i>	11789	07/01/94	5	0	12	no	1.8
<i>Dryopteris fragrans</i>		07/14/93	10	9	4	no	3.7
<i>Dryopteris marginalis</i>		07/14/93	10	4	18	no	1.8
<i>Dryopteris sabae</i>		6/24/95	2			no	0
<i>Dryopteris sacrosancta</i>		6/24/95	5		9	no	0
<i>Dryopteris wallichiana</i>		6/24/95	3			no	0
<i>Osmunda regalis</i>		07/01/94	4	4		no	4
<i>Osmunda regalis 'Purpurascens'</i>	11790	07/01/94	5	5		no	4
<i>Osmunda regalis 'Undulata'</i>	11791	07/01/94	1	1		no	4
<i>Phegopteris connectilis (Thelypteris)</i>		07/14/93	3	1	10	no	1.6

Scientific Name	accession #	Date Planted	Number Planted	Number dead	Height (Inches)	Spores?	Survival Rating
<i>Phegopteris (Thelypteris) decursive-pinnata</i>	11792	07/01/94	5	5		n o	4
<i>Polypodium virginianum</i>		07/14/93	10	9	9	n o	3.6
<i>Polystichum acrostichoides</i>		07/14/93	6	5	12	n o	3.5
<i>Polystichum Braunii</i>		6/24/95	10			n o	0
<i>Polystichum lemmoni</i>		6/24/95	9?			n o	0
<i>Polystichum setiferum</i>		6/24/95	5			n o	0
<i>Polystichum setiferum 'Divisilobum'</i>	11794	07/01/94	5	5		n o	4
<i>Polystichum sp.</i>		07/01/93	2	0	13	n o	0
<i>Pteris excelsa</i>		6/24/95	2			n o	0
<i>Thelypteris viridifrons</i>		6/24/95	4			n o	0
<i>Woodwardia fimbriata</i>		6/24/95	3			n o	0

Winter injury rating: 0 = no visible injury; 1= slight winter injury; 2= moderate injury, recovery likely; 3=severe setback, recovery questionable; 4 = winterkilled

Georgeson. What kind of growing year have we had?

Average Temp		Very warm temperatures during the second week of May prompted many gardeners in the Tanana Valley to begin planting annual flower and vegetable gardens by mid May. The highest temperature for the entire 1995 season occurred on May 12. A severe killing frost on May 22 sent many gardeners back to the nurseries to replenish supplies of frost-killed transplants. Several gardeners reported losing flower buds on apples and other flowering trees because of the high early-season temperatures followed by frost. However, we saw no such damage at the botanical garden. Many locations, including the botanical garden and experiment farm, experienced exceptional yields on raspberries and a variety of agronomic crops, especially barley.
May	52.3	
June	58.5	
July	61.9	
Aug	55.6	
Sept	50.6	
Max temperature	85	
Growing season		
last spring frost	May 22	
first fall frost	Sept 4	
frost free days	105	
thaw degree days	3676.5	Following the first light frost on Sept. 4, valley residents were treated to a long, warm Indian Summer that prompted a spectacular display of late-season asters. Many native plants in a few locations were in full bloom by late September including bunchberry, highbush cranberry, and lingonberry. This late bloom may be a precursor to a poor berry year in 1996 depending on how widespread it was.
rainfall (inches)	10.15	
Previous winter season		
Minimum temp	-48	
snowfall	69	

Notes on Evaluation Information for ferns

Patricia S. Holloway - U of Alaska

1. Computer malfunction prevents us from accessing many of our accession numbers. We should have a complete list by next year.
2. Disregard the zero rating in this column if it was planted in 1995; meaningless.
3. Because of the severity of the climate, we don't make any judgements on garden worthiness or commercial value until the plants have survived more than 5 years.

Ferns shipped in 1994

SACRAMENTO

Evaluation for Hardy Fern Foundation

Fern Name	Accession Number	Number Alive in.	Number Dead	Overall Size in.	Length of new growth	Spore past yr.	Commercial Value	Garden Worthiness rate 1 to 5
<i>Athyrium otophorum</i>		1	4	6		no	no	1
<i>Dryopteris arguta</i>		5	0	18		yes	yes	5
<i>Dryopteris bissetiana</i>		5	0	24		yes	yes	5
<i>Dryopteris dilatata</i> Jimmy Dyce		5	0	12	stunted	yes	yes	4
<i>Dryopteris dilatata</i> <i>Lepidota cristata</i>		3	2	8	poor growth	no	no	2
<i>Dryopteris f-m undulata</i> Robusta		5	0	24		yes	yes	3
<i>Osmunda regalis</i> <i>Purpurascens</i>		2	0	24		no	no	2
<i>Osmunda regalis</i> <i>Undulata</i>		4	1	24		no	no	2
<i>Phegopteris decursive-pinnata</i>	we had this already but unnamed: hardy but invasive							
<i>Polystichum setiferum</i> <i>Divisilobum</i>		4	1	18		yes	yes	4



OTHER GARDENS

Birmingham Botanical Garden reports that their fern glen is still recovering from severe storm damage several years ago. They are once again adding ferns and should be able to fully participate in the near future.

Strybing Arboretum regrettably announces that their collection was badly damaged by wind and rain storms earlier this year. The storms destroyed a fence and unfortunately allowed vandals access to the garden. Their fern collection has been decimated.

New York Botanical Garden did not submit a report.

The Garden in the Woods

Catharine W. Gules
New Gloucester, Maine

The character of New England's landscapes can usually be traced to the ice sheets that once covered this part of the country, and that of The Garden in the Woods, in Framingham, Massachusetts, 20 miles west of Boston, is no different. Owned by the New England Wildflower Society, this garden is certainly the premiere location at which to view and study the region's native flora. Like such New England institutions, it has a history which only adds to its interest. And that takes us back to the glaciers.

When grinding over the 45 acres that now comprise the garden's property, the glaciers did its future founder a great service by leaving behind a tortured landscape of eskers, drumlins and kettleholes. In time these features provided the variety of locations and microclimates required by a collection of New England's plants. But the glaciers also left behind another resource--gravel--which the property's earlier owners, the directors of the Old Colony Railroad, saw as an investment. Thus what is now a beautiful landscape might have become yet another gravel pit.

The garden's founder, Will C. Curtis, received a degree in landscape architecture from Cornell University in 1919 and was one of those who planned the park system of Schenectady, N.Y. He then entered the employ, in Massachusetts, of Warren H. Manning, who, until 1896 had worked for Frederick Law Olmsted and who was one of the founders, and a president, of the American Society of Landscape Architects. Thus Curtis was in the right time and place to absorb the

thinking of the early leaders of his field. But according to H.J. Supnick's history of the garden, Curtis was more interested in the "landscape" half of his title than in the "architect," and he was also deeply interested in horticulture. At the entrance to the garden, there is a plaque quoting

discovered and the knowledge so gained eventually passed on in an effort to curb the wholesale destruction of our most beautiful natives. This is to be my contribution to conservation. --Will C. Curtis, 1934."

In 1931, Curtis bought 30 acres from the railroad and, without outside support, began to develop the garden. At that time, he worked from a one-room cabin and a small greenhouse. Supnik, in his history of the garden, notes that Curtis "never used plans, and there is no evidence of any drawings. His design studies were in the earth, and through experimentation and trial and error they became dynamic landscapes. His approach was an abstraction of nature, recapturing the power of the edge, glade and grove, as well as that of color, texture and fragrance." Between 1931 and 1965, when Curtis was 82, he and Howard Stiles, whom Curtis had made a partner in the enterprise, worked on the garden, creating the habitats required by the different flora of New England.

What does one see today? And what about the 84 species of ferns and fern allies that grow there? Well, if one goes in October, as I did, one does not see the plants for which the garden is so famous: the spring-flowering orchids, trilliums, blue-

bells, and, following these, summer color in forest and meadow. On the other hand, fall offers gentians, asters, pitcher plants and the bright hues of changing foliage. Furthermore, with temperatures still well above the frost point, many of the ferns were still growing healthily, or displaying their own fall hues. For example, the very common Hayscented fern and the New York fern could be seen in their autumn, cream-colored stages. At one point I came around a bend in a path and there was a large Male fern, some of whose fronds had turned a stunning deep purple.



Fertile fronds - *Onoclea sensibilis*.
Photo courtesy of the NE Wild Flower Garden.

Curtis's vision: "Garden in the Woods is a dream in the realization, a years' long dream about a big wild garden and finding out why wild flowers will grow here and not there: it is a tract of beautiful woodland and meadow only nineteen miles from Boston, where I am bringing together all the wild flowers and ferns hardy in this latitude and establishing them in natural environments where they can easily be reached and enjoyed by the interested public. In other words it is a wild flower sanctuary in which wild plants will be grown, their likes and dislikes

The first, and oldest section of the garden is a woodland area, and there one finds Maidenhair and Christmas ferns, and Goldie's and Boott's wood ferns. Farther down the path a limestone rock garden was built with blocks of tufa. The featured flower here is the spreading globeflower, and the accompanying ferns include the Ebony spleenwort and the Walking fern. An area called Laurel Bend, for its Mountain Laurels, underlain by the glacial gravel, is the site for ferns that can take a drier location, among them the Hairy lip fern, Scott's spleenwort and *Adiantum Pedatum aleuticum*. As one continued along the main trail, one comes to a boggy area, just right for the Massachusetts fern, the Netted and Virginia chain ferns, and the Royal fern. These last grow to great size, a testimony to the ideal conditions in which they are planted.

The trail then leads to a recreated pine barren, characterized by sandy soil, and there the visitor can see the rare Hartford fern growing very healthily. There is even a separate section featuring plants found west of the Mississippi river which will grow in the climate of Massachusetts. These include the Arching wood fern and Western sword fern. Also, there was a bristle-cone pine! Clearly, this is a garden planted for the ages. The property includes a brook whose banks provide an ideal site for Interrupted and Cinnamon ferns which also grow to a much greater height than they do in Maine. Finally, not far from the visitor center, where the main trail starts and ends, a New England rare plant garden is under development. Perhaps the society will include in it New England's botrychium species as well as *Ophioglossum vulgatum*; at present these are not found in the collection.

Thirty years ago, Curtis and Stiles transferred ownership of the garden to the New England Wild Flower Society, an organization dating from 1900 which was then based in Boston. The society enlarged the garden, buying 15 more acres of land to protect it from development, and they have renovated and extended some of the beds. In addition to the main Curtis Trail, which takes the visitor through all the garden's habitats, there are now

two longer trails through wild areas of the property.

Because the ferns are spread throughout the garden, according to their habitats, it may be difficult to find one or another of them, and not all the plants are labelled. The visitor interested in seeing all the garden's fern holdings, or any plants of interest, is advised to phone its Education Department ahead to arrange help in finding the locations of such plants. Barbara Pryor, of the Education Department, added that in May, when the garden is "a fairyland . . . breathtaking," and when visitors come in great numbers, she and the staff are so busy that they cannot promise to be available to assist with individual requests. Though there are guided tours at 10 a.m. each day, the guides are understandably not prepared to identify every plant on the tour!

In addition to The Garden in the Woods, the society has seven other sites in New England where rare plants are protected. In Massachusetts there is one, the Arbutus Sanctuary, in Winchendon. In Vermont, the society oversees the Esqua Bog Natural Area, Hartland; in New Hampshire, the Plainfield Sanctuary, Plainfield; and in Maine, the Harvey Butler Rhododendron Sanctuary, Springvale; the Robert P. Tristram Coffin Wild Flower Reservation, Woolwich; the Annie Sturgis Sanctuary, Vassalboro and the Wayne Bog, Wayne. All but the last are open to the public, and full information about them can be obtained from the society at the address given below.

The society is also the coordinator of the New England Plant Conservation Program (NEPCoP), which brings together 68 private organizations and governmental agencies "to prevent the extinction and promote the recovery of this region's endangered plants." In its literature the society lists its five objectives: horticulture, education, research, habitat preservation and conservation advocacy.

The garden is open to the public from April 15 to October 31, Tuesdays through Sundays from 9 a.m. to 5 p.m., with the closing hour in May extended to 7 p.m. However, one does not have to visit the

garden to benefit from it. Readers of Curtis's statement of his ambition quoted above noted that he was interested in education about wild plants as well as their preservation. The New England Wild Flower Society offers a number of publications for sale. Titles include *Special Habitats in New England*, *New England Plant Conservation Program*, and the individual issues of the society's magazine, *Wild Flower Notes*. The society also offers courses and trips, and rents out slide programs, and all these are available to non-members for a supplemental fee. For further information, call (508) 877-7630 or write to The Garden in the Woods, 180 Hemenway Rd., Framingham, MA 01701.

Finally, when the visitor leaves the garden, there is a perfect place to go for refreshments. The Wayside Inn, commemorated in Henry Wadsworth Longfellow's poem, is very close by. What a perfect place in which to relax after a hike in Will Curtis's garden.

Barbara Pryor and Ginger Carr, of the garden's staff, were most helpful in obtaining information for me, and I wish to acknowledge their assistance.

Literature consulted:

"Curtis Trail guide for a walk through the Garden in the Woods," as well as a plant list and brochures prepared by the New England Wildflower Society.

Lellinger, David B. 1985. *A Field Manual of the Ferns & Fern-Allies of the United States and Canada*. Washington, D.C.: Smithsonian Institution Press. 389 p.

Mickel, John T. 1979. *How to know the ferns and fern allies*. Dubuque, Iowa: Wm. C. Brown Company. 229p.

Mickel, John T. 1994. *Ferns for American Gardens*. New York: Macmillan Publishing Company. 370 p.

Supnik, Howard Jay. 1985. "A Garden in the Woods." This -page manuscript provided historical information about the garden.

Photographs from The Garden in the Woods:

1. Glade fern (*Athyrium pycnocarpon*). Photograph by John A. Lynch.
2. Detail of the fertile frond of the Sensitive fern (*Onoclea sensibilis*). Photograph by John A. Lynch.
3. Goldie's wood fern (*Dryopteris goldiana*). Photograph by C.W. Guiles.

	A	B
1	The Garden in the Woods: List of Ferns and Fern Allies	
2		
3	'Athyrium filix-femina 'Minutissimum'	
4	Adiantum pedatum	Maidenhair fern
5	Adiantum pedatum f. billingsae	
6	Adiantum pedatum subsp. subpumilum	Dwarf Maidenhair fern
7	Adiantum pedatum var. aleuticum	
8	Adiantum venustum	Himalayan maidenhair
9	Asplenium platyneuron	Ebony spleenwort
10	Asplenium rhizophyllum	Walking fern
11	Asplenium trichomanes	Maidenhair spleenwort
12	Asplenium trichomanes 'Cristatum'	Crested maidenhair spleenwort
13	Asplenosorus ebenoides	Scott's spleenwort
14	Asplenosorus pinnatifidum	Lobed spleenwort
15	Athyrium angustum f. rubellum	Lady fern
16	Athyrium cyclosorum	Northwestern lady fern
17	Athyrium filix-femina 'Cristatum'	Crested lady fern
18	Athyrium niponicum 'Pictum'	Japanese painted fern
19	Athyrium pycnocarpon	Glade fern
20	Athyrium thelypteroides	Silvery spleenwort
21	Camptosorus rhizophyllus	Walking fern
22	Cheilanthes lanosa	Hairy lip fern
23	Cryptogramma acrostichoides	Parsley fern
24	Cystopteris bulbifera	Bulblet bladder fern
25	Cystopteris bulbifera var. crispa	
26	Cystopteris protrusa	Southern bladder fern
27	Dennstaedtia punctilobula	Hay-scented fern
28	Diplazium pycnocarpon	Glade fern
29	Dryopteris campyloptera	Mountain wood fern
30	Dryopteris clintoniana	Clinton's wood fern
31	Dryopteris clintoniana x goldiana	
32	Dryopteris crassirhizoma	Thick-stemmed wood fern
33	Dryopteris cristata	Crested wood fern
34	Dryopteris expansa	Arching wood fern
35	Dryopteris dilatata 'Lepidota cristata'	
36	Dryopteris dilatata 'Recurvata'	
37	Dryopteris filix-mas	Male fern
38	Dryopteris filix-mas 'Cristata'	
39	Dryopteris filix-mas (unknown cultivar)	
40	Dryopteris goldiana	Goldie's wood fern
41	Dryopteris intermedia	Evergreen wood-fern
42	Dryopteris ludoviciana	Southern wood fern
43	Dryopteris marginalis	Marginal wood fern
44	Dryopteris spinulosa (D. carthusiana)	Spinulose wood fern
45	Dryopteris x boottii	Boott's wood fern

	A	B
46	<i>Equisetum arvense</i>	Field horsetail
47	<i>Equisetum hyemale</i>	Evergreen scouring rush
48	<i>Equisetum hyemale</i> var. <i>robustum</i> (var. <i>californicum</i> ?)	
49	<i>Equisetum scirpoides</i>	Dwarf scouring rush
50	<i>Equisetum variegatum</i>	Variegated scouring rush
52	<i>Gymnocarpium dryopteris</i>	Oak fern
53	<i>Gymnocarpium dryopteris</i> 'Plumosum'	
54	<i>Lycopodium clavatum</i>	Ground pine
55	<i>Lycopodium complanatum</i>	Northern running pine
56	<i>Lycopodium inundatum</i>	Bog club moss
57	<i>Lycopodium lucidulum</i>	Shining club moss
58	<i>Lycopodium obscurum</i>	Princess pine, Tree club moss
59	<i>Lygodium palmatum</i>	Hartford fern, Climbing fern
60	<i>Matteuccia struthiopteris</i>	Ostrich fern
61	<i>Onoclea sensibilis</i>	Sensitive fern
62	<i>Osmunda cinnamomea</i>	Cinnamon fern
63	<i>Osmunda claytoniana</i>	Interrupted fern
64	<i>Osmunda regalis</i>	Royal fern
65	<i>Pellaea atropurpurea</i>	Purple cliff brake
66	<i>Polypodium virginianum</i>	Rockcap fern
67	<i>Polystichum acrostichoides</i>	Christmas fern
68	<i>Polystichum acrostichoides</i> 'Crispum'	
69	<i>Polystichum acrostichoides</i> 'Cristatum'	
70	<i>Polystichum acrostichoides</i> 'Incisum'	
71	<i>Polystichum andersonii</i>	Anderson's holly fern
72	<i>Polystichum braunii</i>	Braun's holly fern
73	<i>Polystichum munitum</i>	Western sword fern
74	<i>Pteridium aquilinum</i> var. <i>latiusculum</i>	Bracken
75	<i>Selaginella apoda</i>	Meadow spikemoss
76	<i>Thelypteris hexagonoptera</i>	Broad beech fern, Southern beech fern
77	<i>Thelypteris noveboracensis</i>	New York fern
78	<i>Thelypteris palustris</i>	Marsh fern
79	<i>Thelypteris palustris</i> f. <i>pufferae</i>	Puffer's marsh fern
80	<i>Thelypteris phegopteris</i>	Northern beech fern
81	<i>Thelypteris simulata</i>	Massachusetts fern
82	<i>Woodsia ilvensis</i>	Rusty woodsia
83	<i>Woodsia obtusa</i>	Blunt-lobed woodsia
84	<i>Woodsia polystichoides</i> var. <i>veitchii</i>	Holly-fern woodsia
85	<i>Woodwardia areolata</i>	Netted chain fern
86	<i>Woodwardia virginica</i>	Virginia chain fern

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